CHAPTERS VI–VIII.

[See page 159, Monthly Weather Review, April, 1905.]

Practical laboratory work in observing, computing, charting, and forecasting, as well as special studies, are expected of the students. At the close of the course, if time permits, a few lectures are given on climates, floods, river stages, atmospheric electricity, optical and acoustical phenomena of the atmosphere.

CONTRIBUTIONS INVITED.

It has occurred to the Editor that possibly among Weather Bureau officials, cooperative observers, and other readers of the MONTHLY WEATHER REVIEW there are some who would occasionally like to send in an article for publication, but refrain because they have not been invited. The majority of the articles that appear in the REVIEW have been voluntary contributions and are of an unofficial character. The Chief of Bureau does not order them written and the Editor is allowed the liberty of publishing whatever will be for the benefit of meteorology. He hopes, therefore, that no one having an interest in the progress of this science will refrain from writing because he has not been invited. None of the articles that appear are to be considered as embodying principles or instructions obligatory upon the service unless, indeed, it is expressly so stated by order of the Chief. Inasmuch, therefore, as each author has the liberty of expressing his own opinion, there is no reason why there should not be a free expression of views on any topic that comes up for discussion. Of course it will sometimes happen that an article may be submitted that can not be published immediately or that may need considerable modification before appearing in print. In such cases the criticisms and advice of the Editor and his assistants will always be at the service of our correspondents.

A CAUTION AS TO HYPOTHESES.

An editor does not always feel free to decline articles offered for publication by distinguished investigators, in fact he usually welcomes new ideas as being the best stimuli to other minds. But he should call the attention of younger students to the danger of piling one hypothesis upon another, building up a work of the imagination that is beautiful to contemplate, but not necessarily in complete harmony with nature. It is much easier for man to describe how the Creator might have done, than to get at the facts of the universe that surrounds us and of which we form a part.

Hypotheses are the essential steps to every investigation. We always try many before we find something that harmonizes through and through with observations and may be temporarily accepted as an apparent law of nature. The investigator often publishes a full statement of his successive trials of hypotheses and their failures as an explanation of the long time required to get at the truth. Other students in the same line of work profit by reading such statements and learn not to be carried away by the enthusiasm inspired by a first apparent happy thought. Some of the most distinguished men in science have been conspicuous for the tenacity with which they adhered to hypotheses that have ultimately been abandoned. Thus, in the struggle to wrest from nature her greatest of all secrets, the structure of a molecule, the theory of Boscovich has had an almost pernicious influence, but may begin to yield good results when we are able to modify it by adding the dynamic considerations that have developed during the past few years. In astronomy the cycles of the ancients reigned supreme for 2000 years until Copernicus, Kepler, and Newton permanently dislodged them. Newton, himself, says "I will not touch hypotheses," and yet he was perpetually discussing them and rejecting them one by one. His theory of universal gravitation was indeed an hypothesis until he was able to demonstrate its validity by utilizing Kepler's rules which were based on observations. In his "Treatise on Optics" he introduced an hypothesis relative to the nature of light whose defense enlisted all the energies of his followers, until the battle was given up two centuries later in favor of the so-called "undulatory theory of light" and even this latter now stands in need of modification.

The mathematician deals with matters of pure hypothesis and logic, but the physicist deals with a material world that he must measure and weigh.

Many illustrations might be cited to show the inadvisability of building up a complex structure of mixed hypotheses and well established facts or laws that is apt to become undermined and eventually to tumble down. The wisest way is to admit only one hypothesis at a time and not build upon it very much until its validity has been established beyond all peradventure. Our contemporary, Nature, has adopted from Wordsworth a line that should serve as a motto for all true lovers of meteorology:

> "To the solid ground
> Of nature trusts the mind which builds for aye."

Not but that we shall make many mistakes in endeavoring to follow nature. We may often deceive ourselves and sometimes be inclined to say that nature deceives us. We often wish to push ahead to the very end of the whole matter, when nature says "Stop right here, the world is not yet ready for the answer to this question."

CORRIGENDA ET ADDENDA.

Page 292, fig. 64, insert the following legend: "Retardation of rotation in different zones of the sun." Page 293, fig. 68, insert the following legend: "The upper section shows the variation in relative number of sun spots in an 11-year period, and the lower section shows the corresponding changes in the

form of the solar corona in passing from minimum to maximum, and back to minimum." Page 294, fig. 70, insert the following legend: "Relative frequency of the occurrence of hydrogen flames as seen on the edge of the northern hemisphere of the sun in a spectroscope; the distribution on the southern hemisphere is similar to that shown on the northern." Page 294, fig. 71, insert the following legend: "Comparison of the annual changes of the prominences on the sun and the temperatures and pressures on the earth during the years 1872–1900."

THE WEATHER OF THE MONTH.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VIII and the average values and departures from normal are shown in Tables I and V.

The normal type of mean pressure obtained during the month; the highest, with values slightly greater than 30.00 inches, obtaining over the South Atlantic and east Gulf States; and the lowest, with values of 29.75 inches, obtaining over the western portion of the southern Plateau region.

The mean pressure for the month was above the normal in New England generally, on the coast of North Carolina, in the upper Mississippi Valley, North Dakota, the slope regions, middle Plateau region, eastern-southern Plateau region, and on the Washington coast; elsewhere it was below the normal. As a rule the departures were small, the greatest positive and negative departures amounting to but .06 inch.

The pressure for the month diminished from that of June, 1905, in the Lake region, upper Mississippi Valley generally, in western Oregon, and northwestern California; elsewhere the mean pressure showed an increase over the preceding month. Over the slope and Plateau regions the increase was somewhat marked, the maximum increase amounting to +.15 inch over portions of the northern and middle slope regions. The greatest decrease was over the northern portion of the upper Lake region, and amounted to —.05 inch.

TEMPERATURE OF THE AIR.

The mean temperature for the month was generally below the normal in the region between the Alleghany and Rocky Mountains, and above normal in the remaining districts. The greatest positive departures ranged from +2.0° to +3.8° and occurred over west-central Idaho, Oregon, and eastern and central Washington. The negative depertures were more pronounced than the positive, as a rule, and covered a much greater area, ranging from —2.0° to —4.2° over most of the region of negative departure.

The average temperatures for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	68.5	+ 0.6	— 9.9	—1.4
Middle Atlantic	12	74.8	+ 0.5	— 6.6	—0.9
South Atlantic	10	79.5	+ 0.3	— 4.6	—0.7
Florida Peninsula*	8	81.6	+ 0.2	+ 2.7	+0.4
East Gulf	9	79.8	— 1.0	— 8.4	—1.2
West Gulf	7	79.7	— 2.2	— 9.6	—1.4
Ohio Valley and Tennessee	11	75.7	— 0.7	— 9.6	—1.4
Lower Lake	8	71.5	+ 0.3	—11.2	—1.6
Upper Lake	10	66.4	— 1.3	— 8.7	—1.2
North Dakota*	8	65.9	— 2.4	— 0.7	—0.1
Upper Mississippi Valley	11	72.5	— 2.6	—10.4	—1.5
Missouri Valley	11	71.7	— 3.4	— 9.2	—1.3
Northern Slope	7	67.9	— 1.5	— 3.7	—0.5
Middle Slope	6	73.5	— 2.8	— 9.9	—1.4
Southern Slope*	6	77.3	— 1.8	—14.3	—2.0
Southern Plateau*	13	76.7	— 2.1	— 5.0	—0.7
Middle Plateau*	8	70.2	— 0.8	+ 3.6	+0.5
Northern Plateau*	12	70.7	+ 2.7	+ 9.9	+1.4
North Pacific	7	62.2	+ 0.9	+ 9.8	+1.4
Middle Pacific	5	68.0	+ 0.8	+ 7.5	+1.1
South Pacific	4	70.4	— 0.3	+ 7.3	+1.0

* Regular Weather Bureau and selected cooperative stations.

By geographical districts the temperature was above the normal in the Atlantic districts, lower Lake region, northern Plateau and north and middle Pacific regions.

Maximum temperatures of 90°, or higher, occurred generally throughout the country, except in portions of the Rocky and Alleghany Mountain regions; of 100 or higher in portions of the following States and Territories: New Jersey, South Carolina, Georgia, Texas, Oklahoma, Indian Territory, Kansas, Colorado, Nebraska, Iowa, South Dakota, New Mexico, Arizona, Nevada, California, Oregon, Washington, and Idaho; of 110°, or higher, in southwestern Arizona, central California, and south-central Washington; and of 120° to 128° in southwestern Arizona and extreme southeastern California.

Freezing temperatures were reported from many Rocky Mountain stations.

In Canada.—Prof. R. F. Stupart says:

> The temperature was from 1° to 2° below average in Assiniboia, also in Manitoba, except in the northern portion; average over the Lake Superior district and in the extreme southwestern counties of Ontario, and everywhere else above the average. Interior stations in British Columbia recorded the largest positive departures amounting to 4°. Quebec and the Maritime Provinces gave a positive departure of about 2°, and the larger part of Ontario from 1° to 2°.

PRECIPITATION.

The distribution of total monthly precipitation is shown on Chart III.

The precipitation was below normal in the Pacific and Plateau regions, and portions of the slope regions, central Missouri, Ohio, and upper Mississippi valleys, the east Gulf States, southern New England, east-central New York and New Jersey, and Florida generally; and above normal in the remaining districts. The greatest deficiency did not equal 3.0 inches, while the excess in east-central Maryland, District of Columbia, and the western portions of Virginia and North Carolina ranged from 4.0 to 7.2 inches; 4.0 to 9.6 inches in northwestern Louisiana, western Arkansas, and southwestern Missouri, and 8.0 inches in western South Dakota.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	3.12	86	—0.5	—4.4
Middle Atlantic	12	5.77	138	+1.6	—1.6
South Atlantic	10	6.53	110	+0.6	—2.4
Florida Peninsula*	8	8.10	125	+1.6	+1.5
East Gulf	9	4.78	86	—0.8	—0.1
West Gulf	7	5.28	171	+2.2	+6.3
Ohio Valley and Tennessee	11	3.49	85	—0.6	—3.4
Lower Lake	8	3.18	103	+0.1	—1.2
Upper Lake	10	3.94	130	+0.9	+0.8
North Dakota*	8	4.12	151	+1.4	+1.1
Upper Mississippi Valley	11	3.00	79	—0.8	—2.4
Missouri Valley	11	4.87	129	+1.1	+1.4
Northern Slope	7	2.99	177	+1.3	+3.1
Middle Slope	6	4.26	144	+1.3	+4.8
Southern Slope*	6	4.30	130	+1.0	+6.8
Southern Plateau*	13	0.97	71	—0.4	+5.7
Middle Plateau*	8	0.52	84	—0.1	+1.0
Northern Plateau*	12	0.44	69	—0.2	—1.1
North Pacific	7	0.23	25	—0.7	—7.7
Middle Pacific	5	T.	100	0.0	—2.6
South Pacific	4	0.05	100	0.0	+3.1

* Regular Weather Bureau and selected cooperative stations.